Sleep Lab Monitor - Progress Report 8

3/14/09-3/27/09

Project Title:

A combined Thermistor, Pressure, and CO_2 device for use in the Sleep Laboratory

Team Members:
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Problem Statement:

There are three measurements taken from each breath during polysomnography. The following devices are used: a thermistor to detect temperature difference between inhaled and exhaled air, pressure sensors that show a flattening pressure profile during upper airway narrowing, and CO_2 sampling tubes to sense End Tidal CO_2. These three measurements are taken from two different devices placed under the child's nose, with two prongs going into each nostril. This method can be inaccurate if a nostril was to become obstructed, and each device may not sample from both nostrils as well as the mouth. Moreover, the current apparatus may be uncomfortable for the child as well as insecure on the child's face. This could cause a disruption of sleep and a possibility of the devices becoming unfastened during the night. To solve these problems, the goal is to design and develop a prototype that combines these three measuring devices into one apparatus that samples from both of the nostrils as well as the mouth, and attaches to the child in both a durable and comfortable fashion.

Reinstatement of Team Goals from Last Week:

1. Put together the survey to send to pediatric sleep labs
2. Each member will contact 2-3 sleep labs with survey
3. Continue to research for medical application thermistors with smaller time constants

Summary of Team Accomplishments:

1. Assigned tasks for over spring break
    a. Each member found 2 thermistors for medical applications
    b. Each member was assigned 2-3 sleep labs to contact by April 1st
    c. Brainstormed ideas for what to say on the phone and questions for survey
2. Lindsey and Nicole met on Wednesday, March 25th to put together information for the survey and prepare for client meeting
    a. Looked at WARF website for protection of our ideas, need to complete the disclosure document by next week
    b. Wrote up a rough draft of what each of us will say on the phone when we call the sleep labs
    c. Lindsey called respironics to find out about what filters are applied on the TFlow (thermistor channel) for the Alice system
        i. They apply a 0.02Hz LPF and a 47Hz HPF
    d. Nicole called Protech to find out what the specs were on the thermistors they use
        i. They will have to be contacted again to speak with more technical staff or engineer
    e. Wrote up questions to ask at client meeting
    f. Checked prices on thermistors that each member found on digikey
        i. The faster time-constant thermistors were more expensive around $8 a piece
3. Lindsey and Nicole attended Client meeting on Wednesday, March 25th at 3:30pm
    a. We asked him about filling out a disclosure agreement
        i. He said we should get more information from our advisor about whether or not we need a disclosure agreement
    b. Made a decision about what thermistors to buy
        i. He told us to go for the expensive thermistors with the faster time constants
            1. The overall cost for our disposable device is much less significant than major costs at the lab
            2. The device would still be much cheaper than expensive Protech devices used currently
    c. Discussed out back-up plan
        i. If we have to, we would build a filter for our original thermistors, it would serve as an adapter hook up for our current device
    d. Went over what to ask in our survey
        i. Came up with a list of questions
        ii. He made corrections on our phone dialog draft

Statement of Team Goals for Upcoming Week:

1. Have all sleep labs contacted by Wednesday, April 1st
2. Order new thermistors by Monday, March 30th
3. Contact Linda, the lab technician, about setting up next testing date at end of April

Project Schedule

1/23/09-1/30/09: First client meeting, background research for modifying current prototype
1/31/09 – 2/6/09: Perform background research
2/7/09 – 2/13/09: Background research, modification alternatives
2/14/09 – 2/20/09: Continue to brainstorm for modification ideas, test current prototype
2/21/09 – 2/27/09: Work on design and choose design modification alternatives
2/28/09 – 3/6/09: Complete Mid Semester Presentations
3/7/09 – 3/27/09: Develop modifications and build new prototype
3/28/09 – 4/24/09: Test modified prototype
4/25/09 – 5/1/09: Complete and give Final Presentation, submit notebooks and paper

Team Difficulties:

None

Expenses:

None

Activities and Individual Accomplishments:

Nicole – 6: Brainstormed survey ideas, called protech,continued to consult with GE about best thermistors to use, attended client meeting, wrote up final survey document
Jason – 3: researched thermistors, brainstormed survey ideas
Lindsey – 6 hours: Researched thermistors, contacted QTI and Betatherm about quotes on their 10k thermistors, called Respironics, attended client meeting
Robyn – 4 hours: researched thermistors, brainstormed survey ideas

Total hours for this week: 19
Cumulative hours to date: 135.5

Sleep Lab Monitor Gantt Chart Spring 2009												Completed:			
												In Progress/Planned:			
	1/23	1/30	2/6	2/13	2/20	2/27	3/6	3/13	3/20	3/27	4/3	4/10	4/17	4/24	5/1
Background research															
Test Current Prototype															
Client Meetings															
Meetings with Professors/Tech															
Brainstorm design															
Design Modification alternatives/mat															
Midsemester presentation															
Finalize design ideas															
Ordering materials															
Construct modified prototype															
Test modified prototype & Materials															
Plan final poster presentation															
Write final paper															
Final advisor meeting															